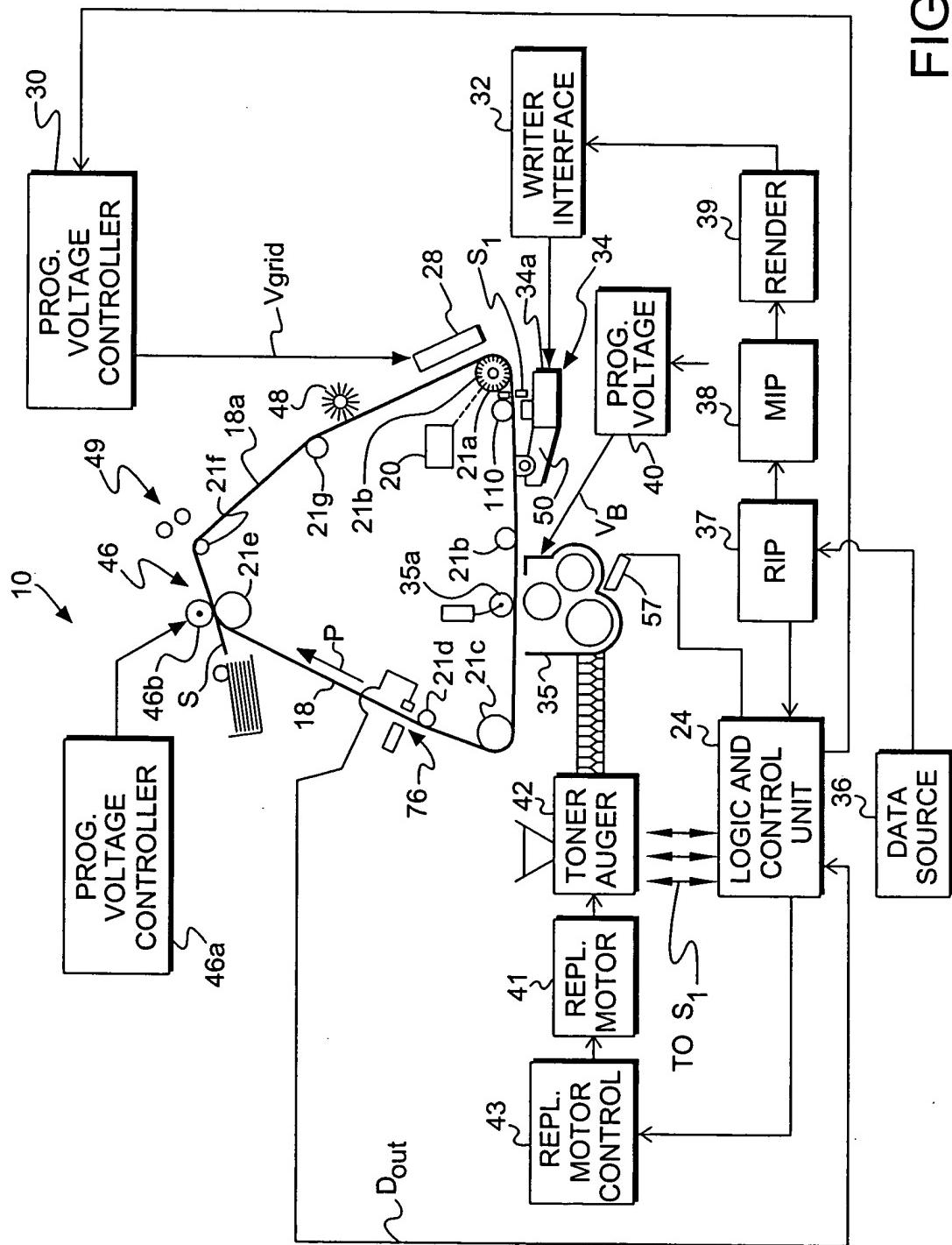


FIG. 1a



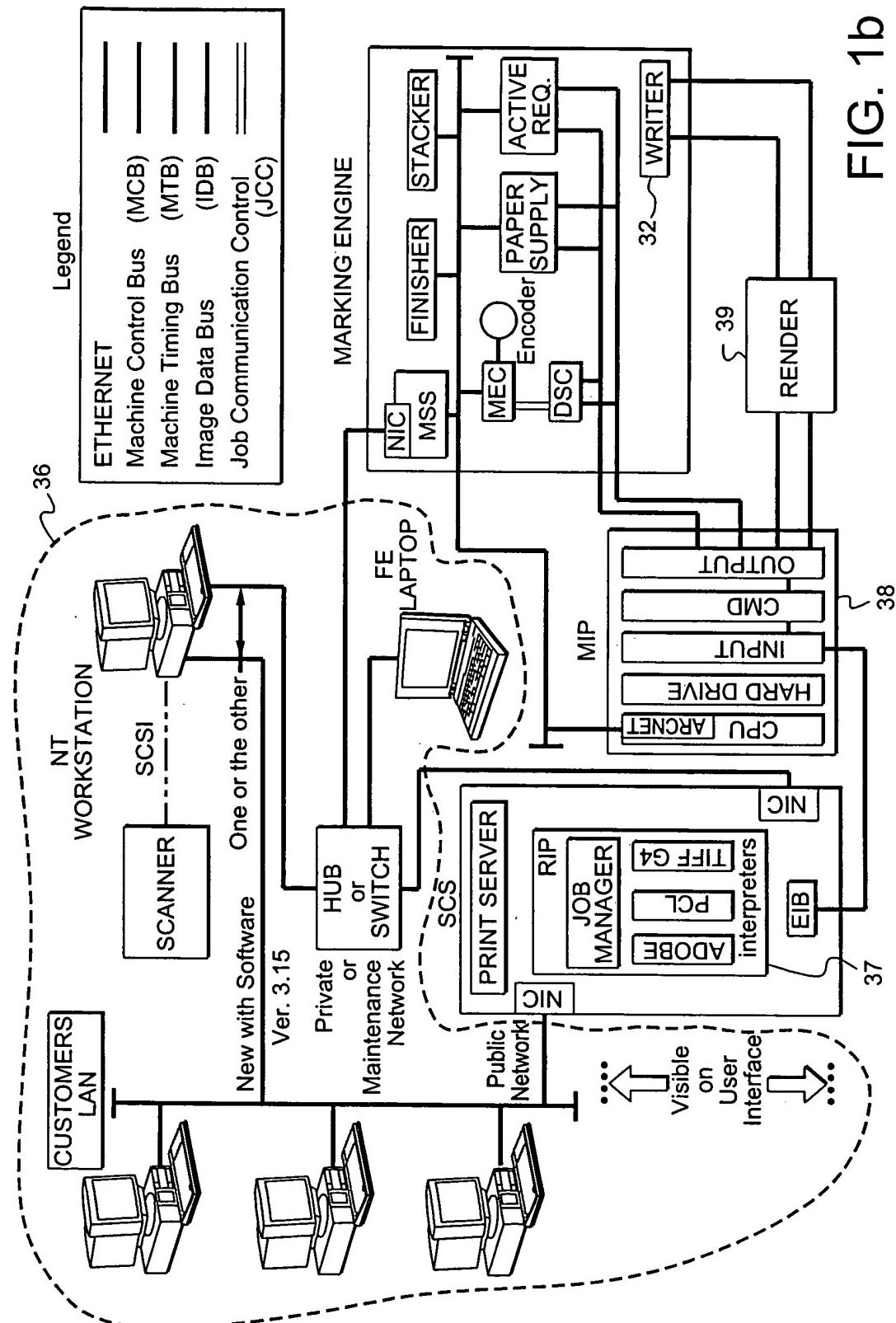


FIG. 1b

Algorithm Block Diagram

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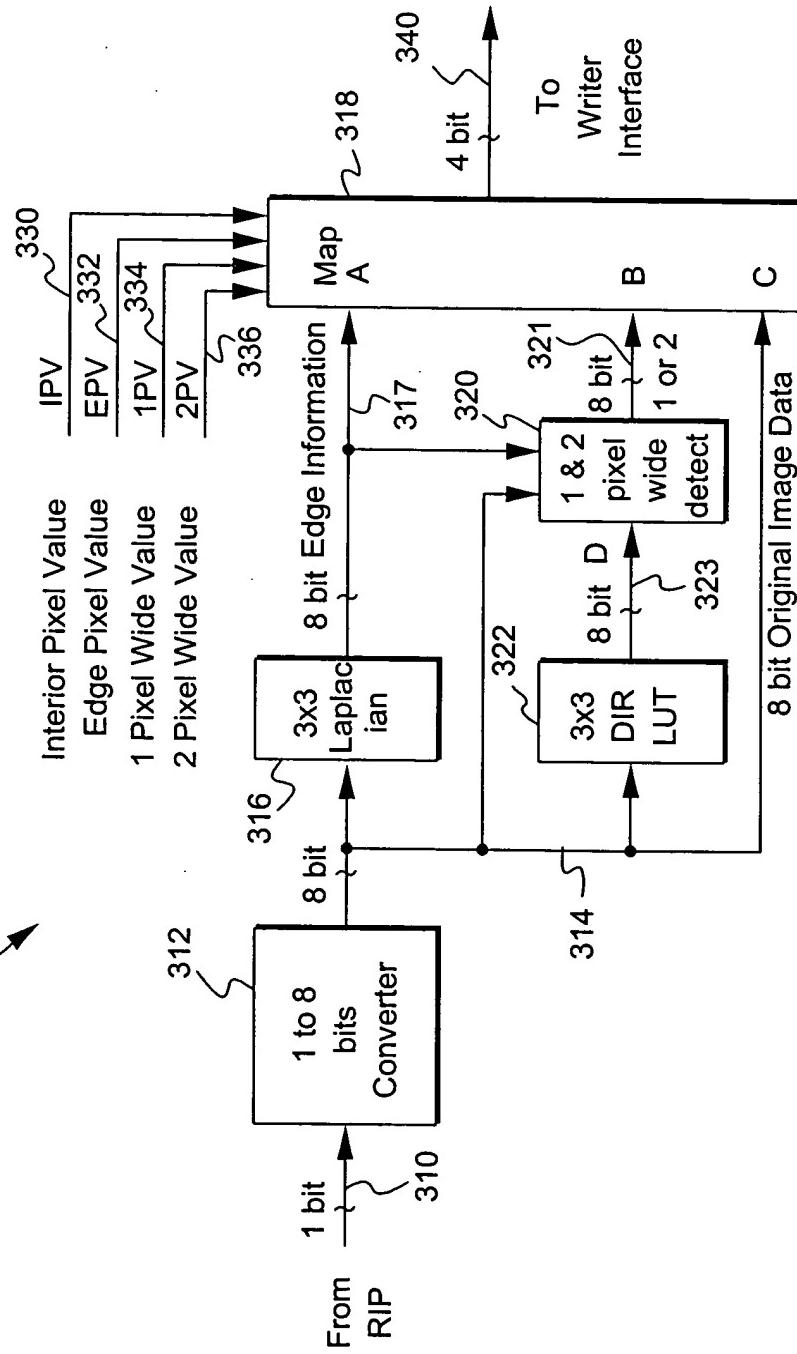


FIG. 2

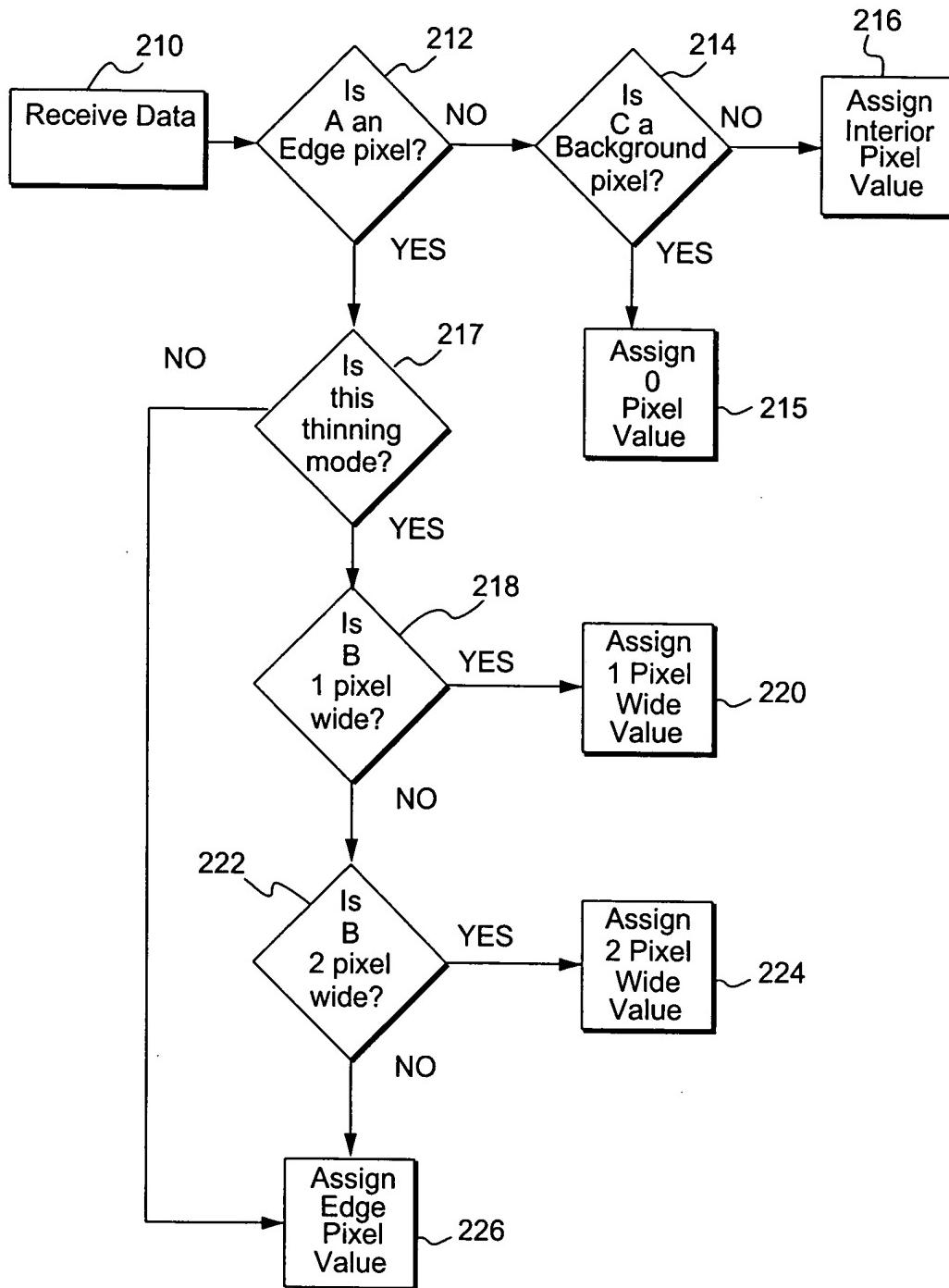
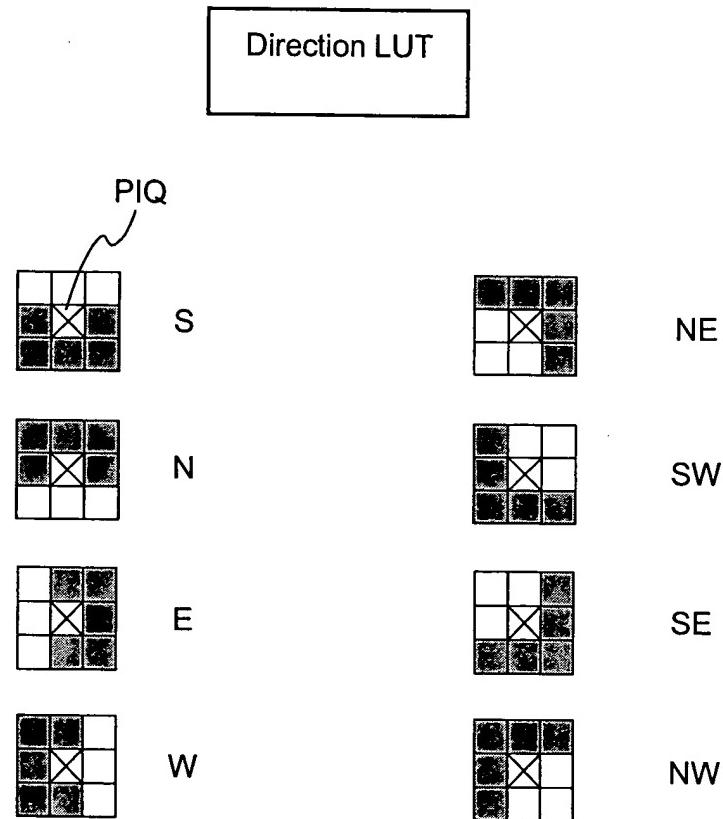
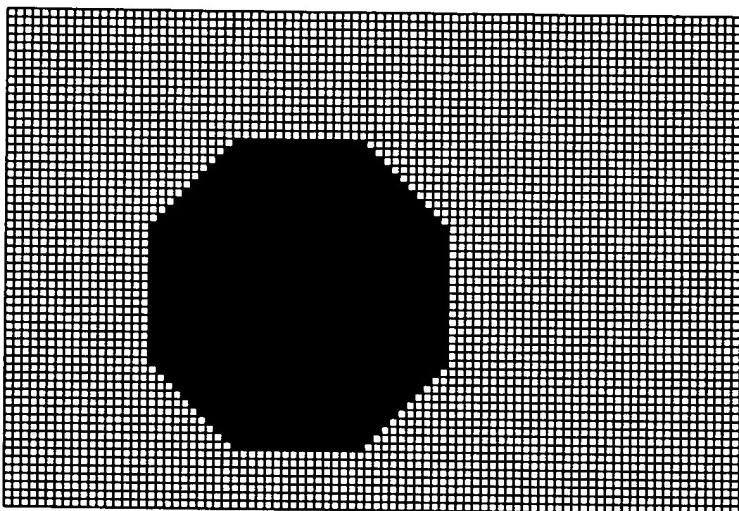


FIG. 3



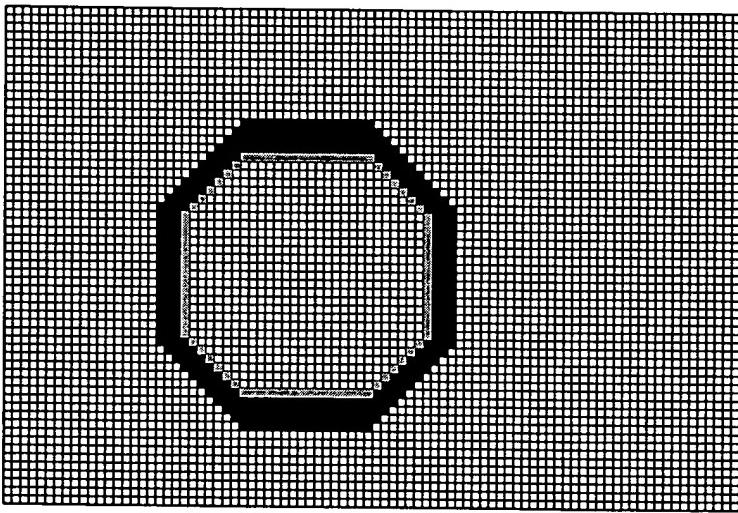
All other combinations result in zero.

FIG. 4



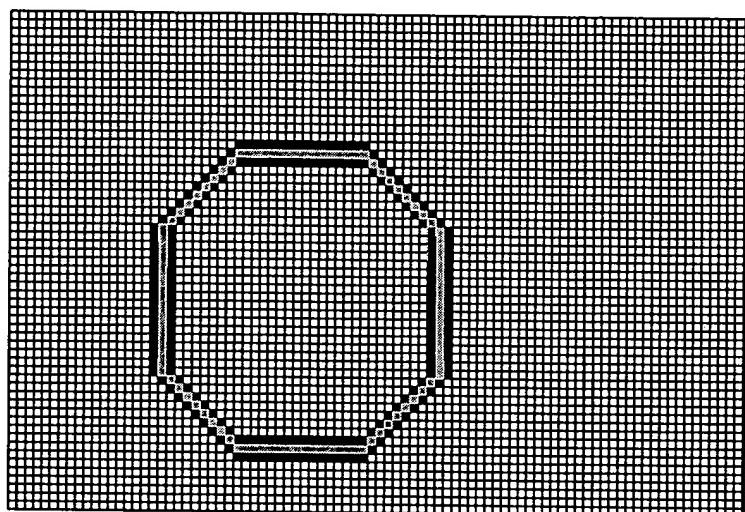
Original object
bitmap

FIG. 5a



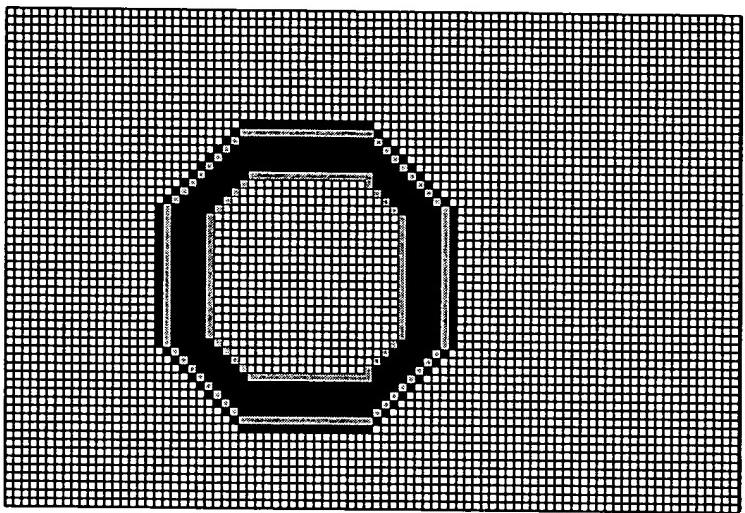
Four onion skin
layers when thinning

FIG. 5b



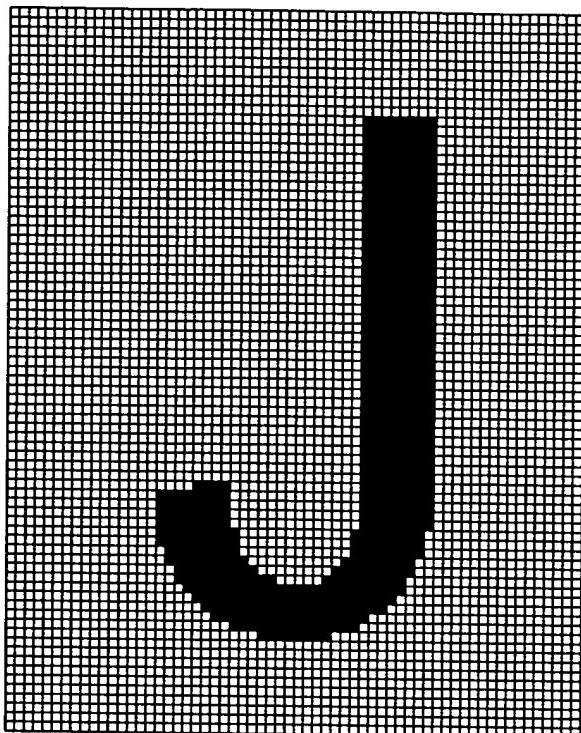
Three onion
skin layers when
thickening

FIG. 5c



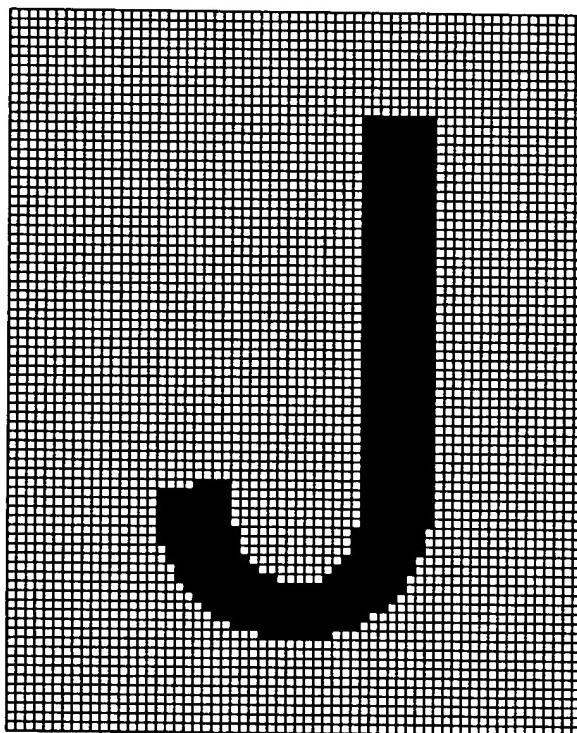
All layers
(thickening and
thinning)

FIG. 5d



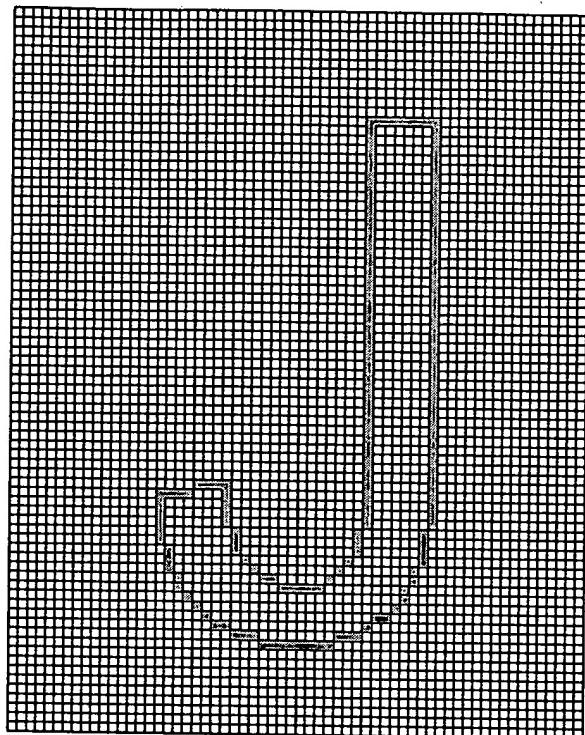
Original
Binary Bitmap

FIG. 6a



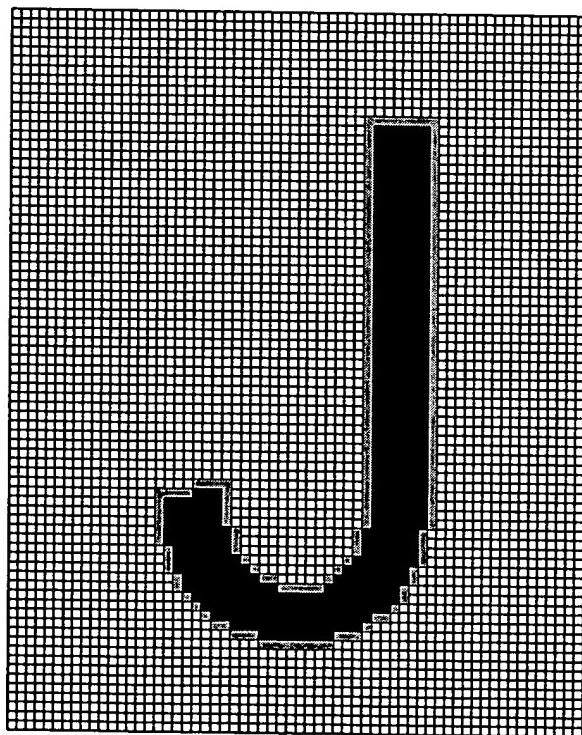
Same grey level pixel value
value assigned to edges
and solid area density

FIG. 6b



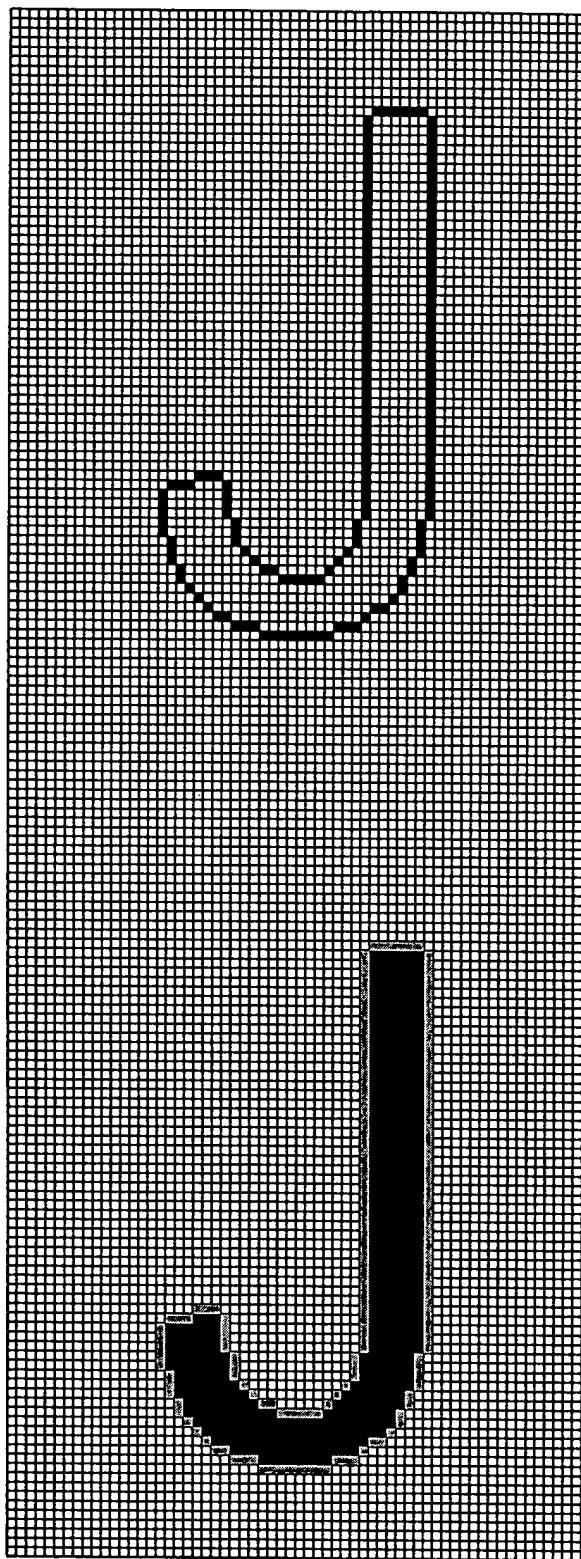
Edges
when thinning

FIG. 6c



Lightened-
Solid area density reduced
Letter thinner

FIG. 6d



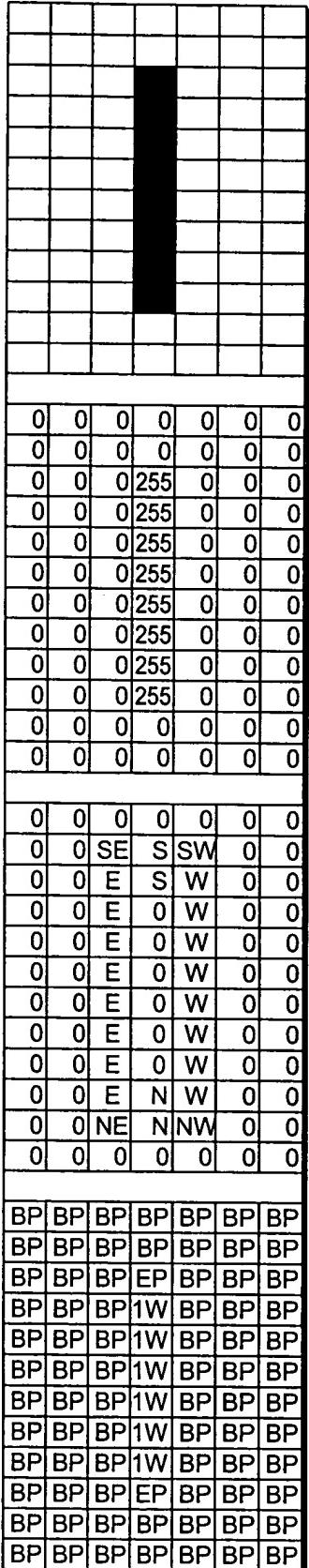
Edges
when thickening

FIG. 6e

Thickened
Letter thickened by applying
gray to edges which were
originally white

FIG. 6f

1 Pixel Wide Detection



Original 1 pixel wide line

FIG. 7a

Edge Pixels

FIG. 7b

Direction Values

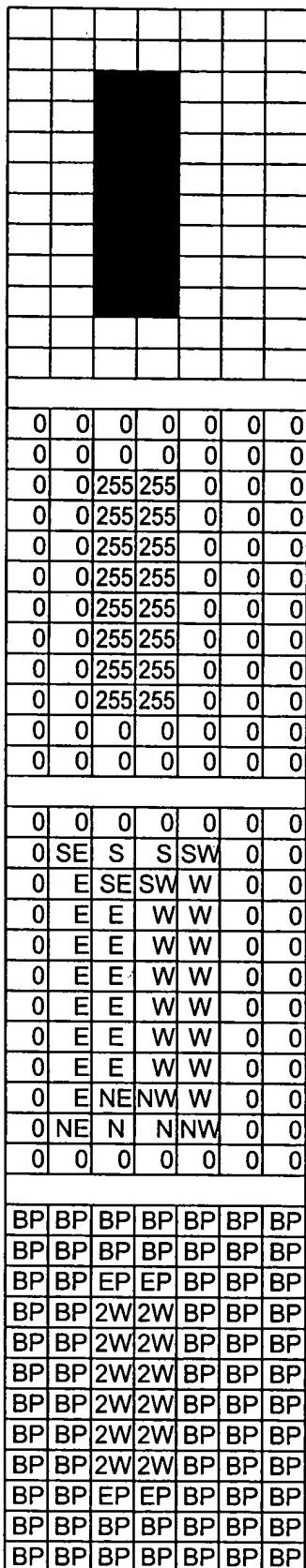
FIG. 7c

Assignment
BP: Background Pixel
EP: Edge Pixel
1W: One Pixel Wide Line

2 Pixel Wide Detection

Original 2 pixel wide line

FIG. 8a



Edge Pixels

FIG. 8b

Direction Values

FIG. 8c

Assignment

BP: Background Pixel

EP: Edge Pixel

2W: Two Pixel Wide Line

FIG. 8d

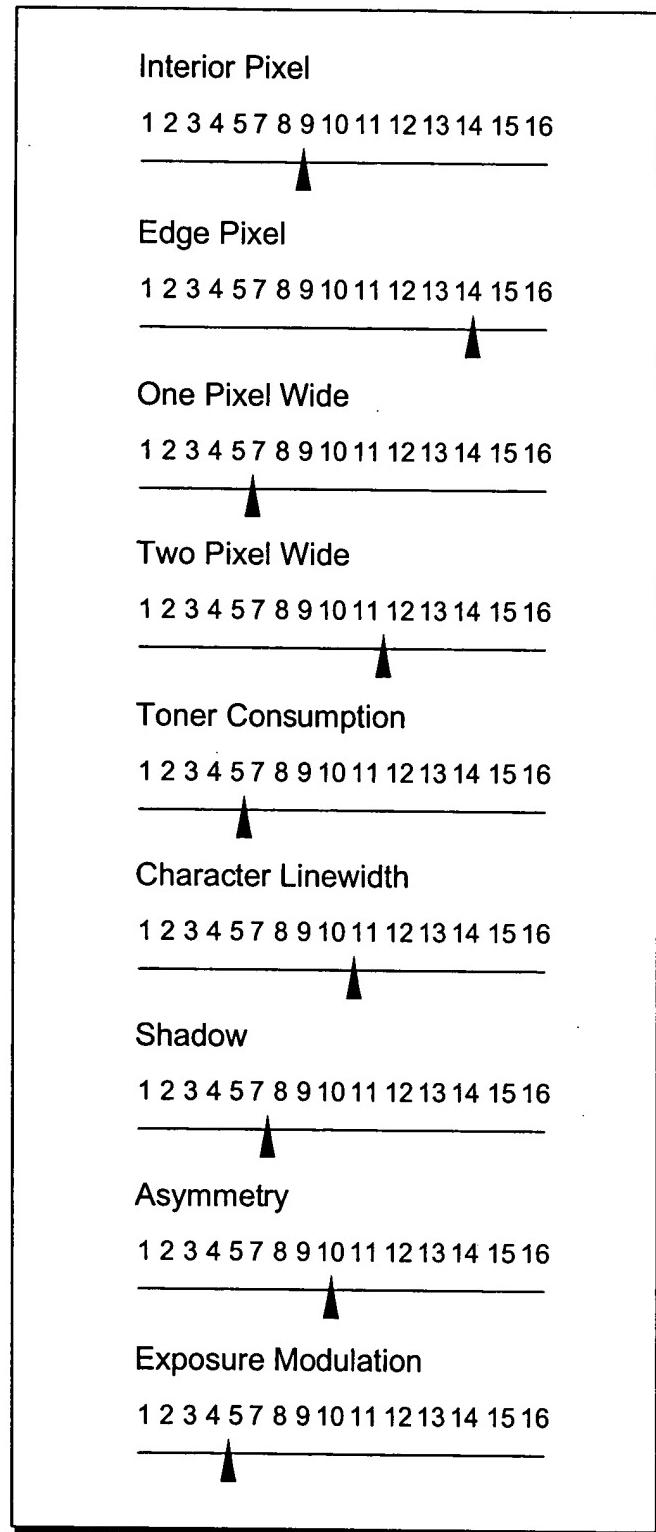


FIG. 9

FIG. 10

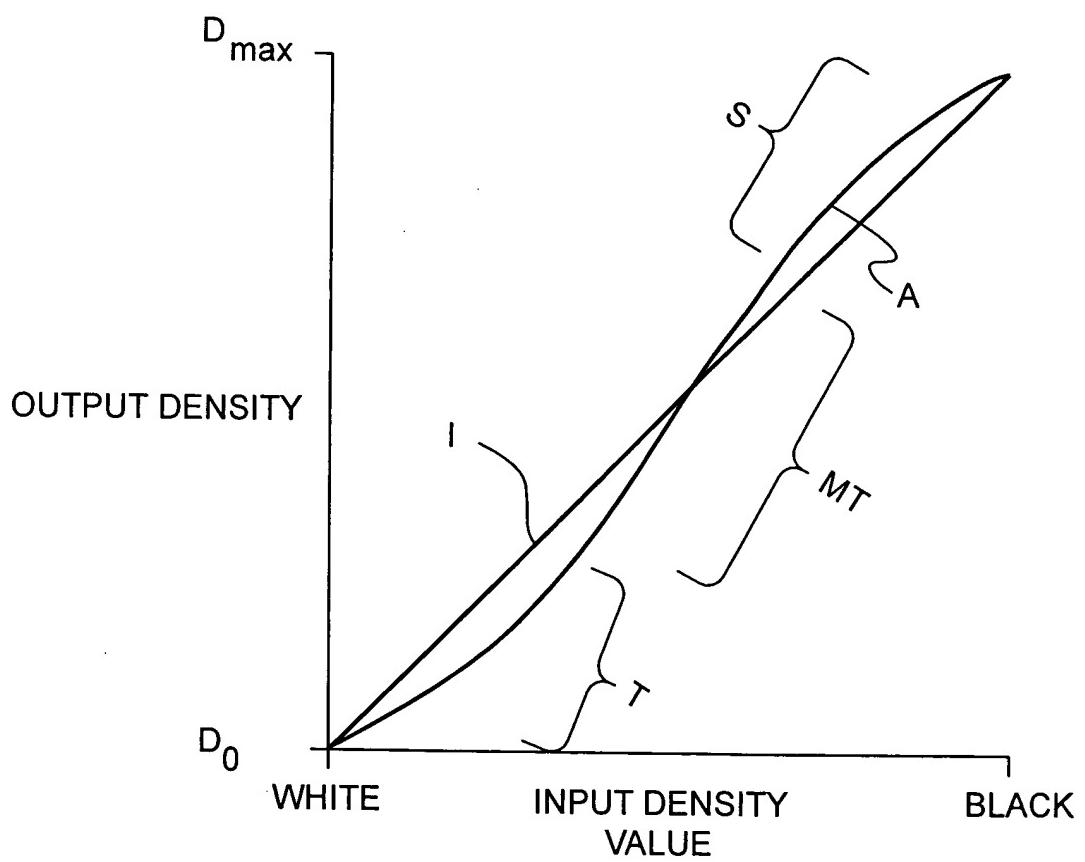


FIG. 11

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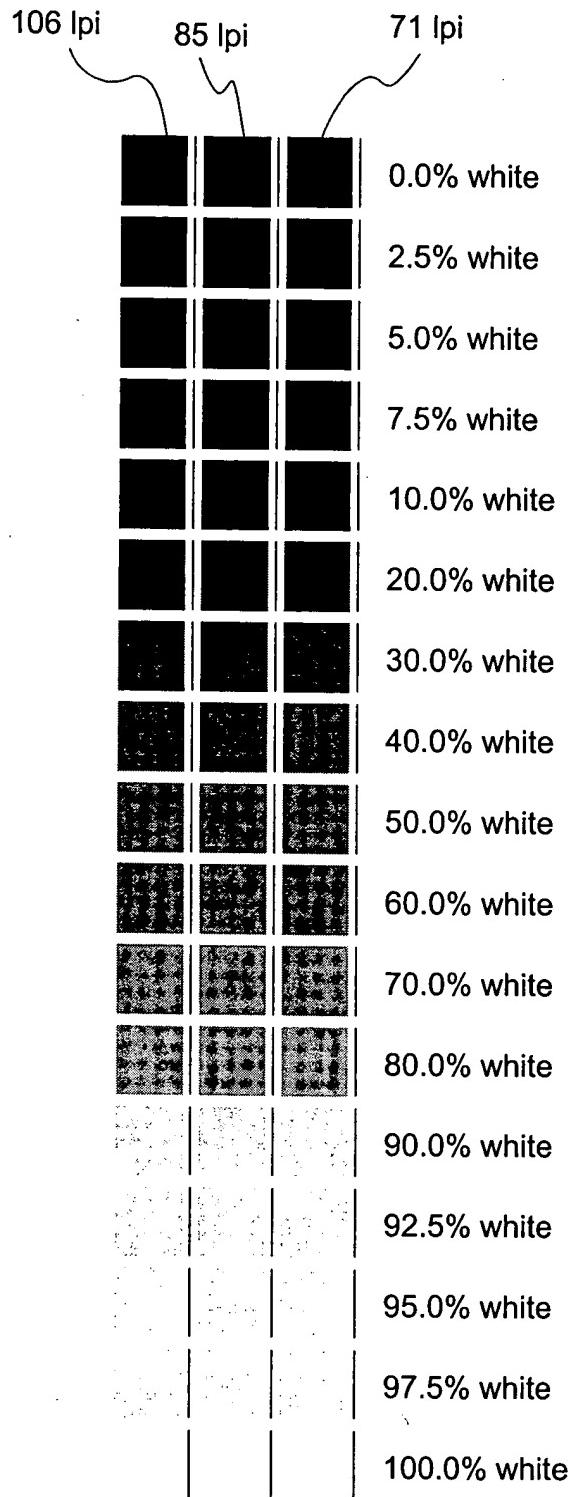


FIG. 12

default round round
106 85 71

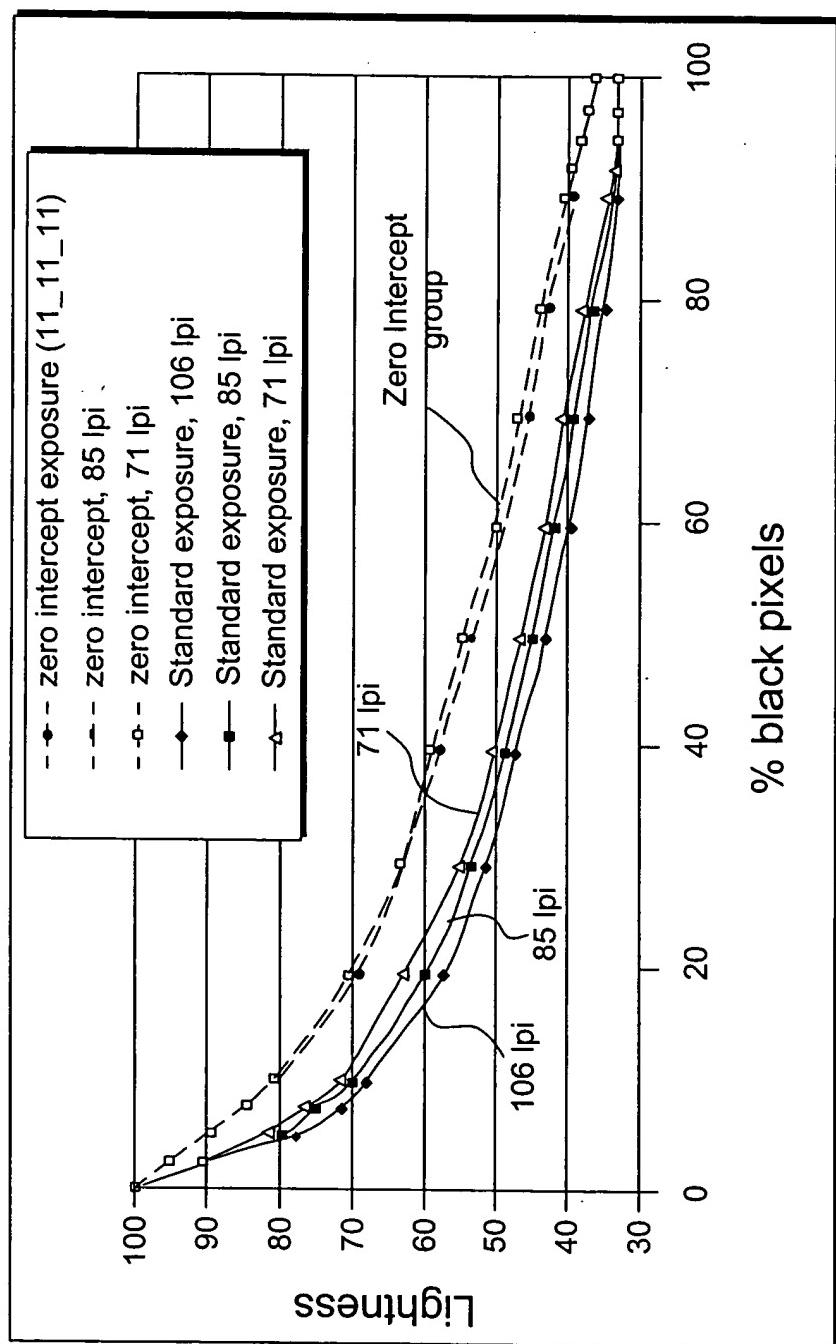


FIG. 13

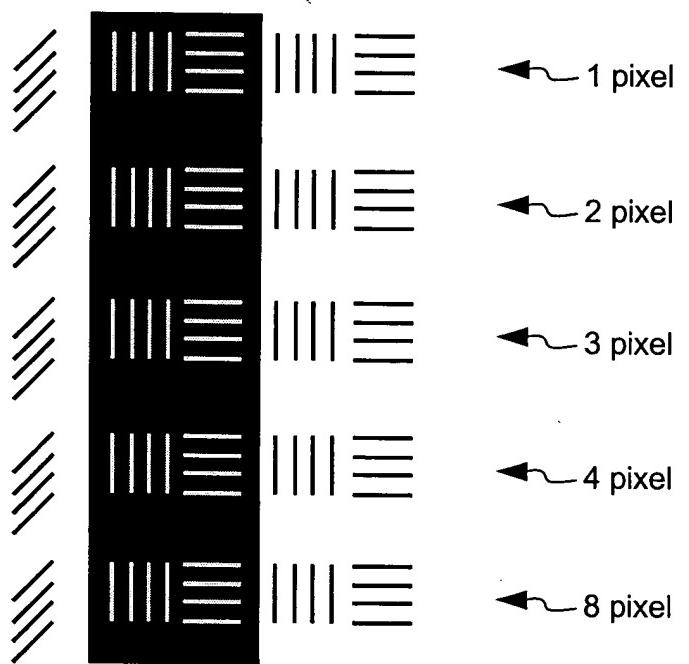


FIG. 14

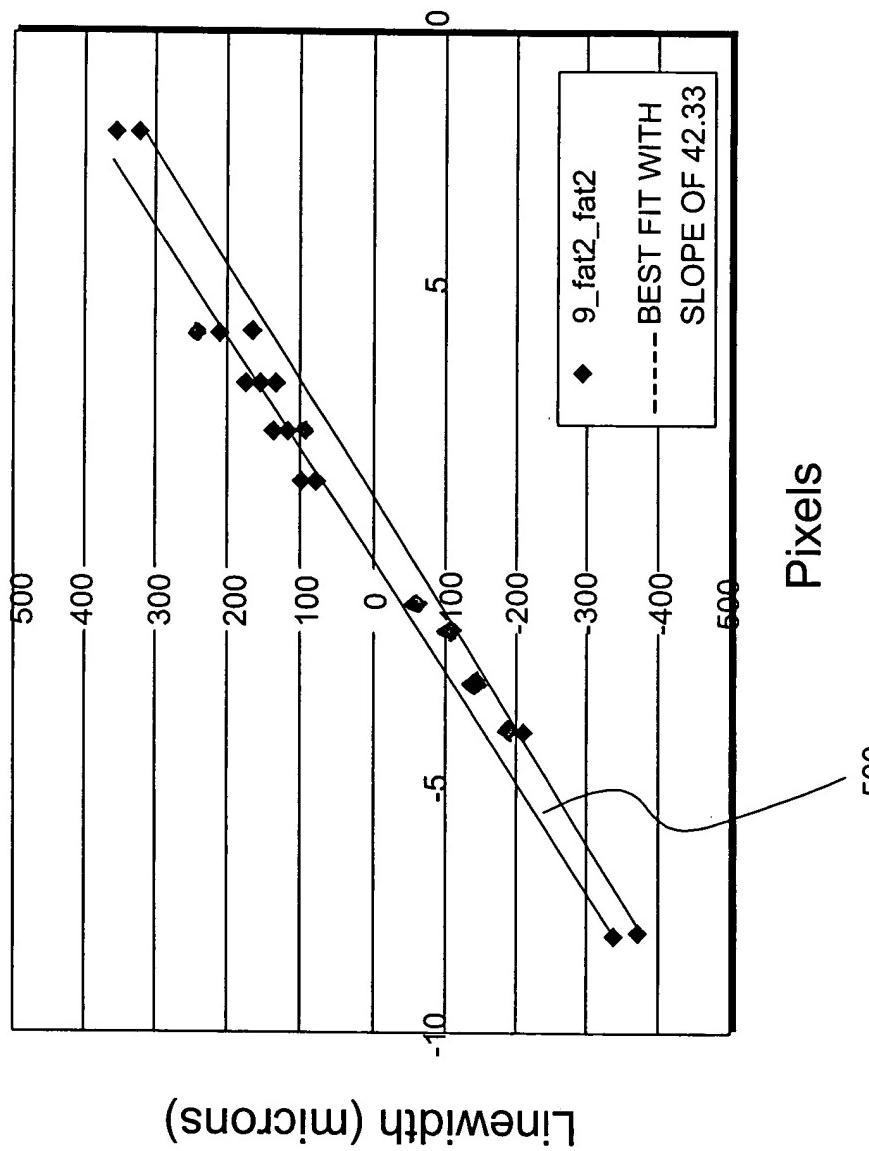


FIG. 15

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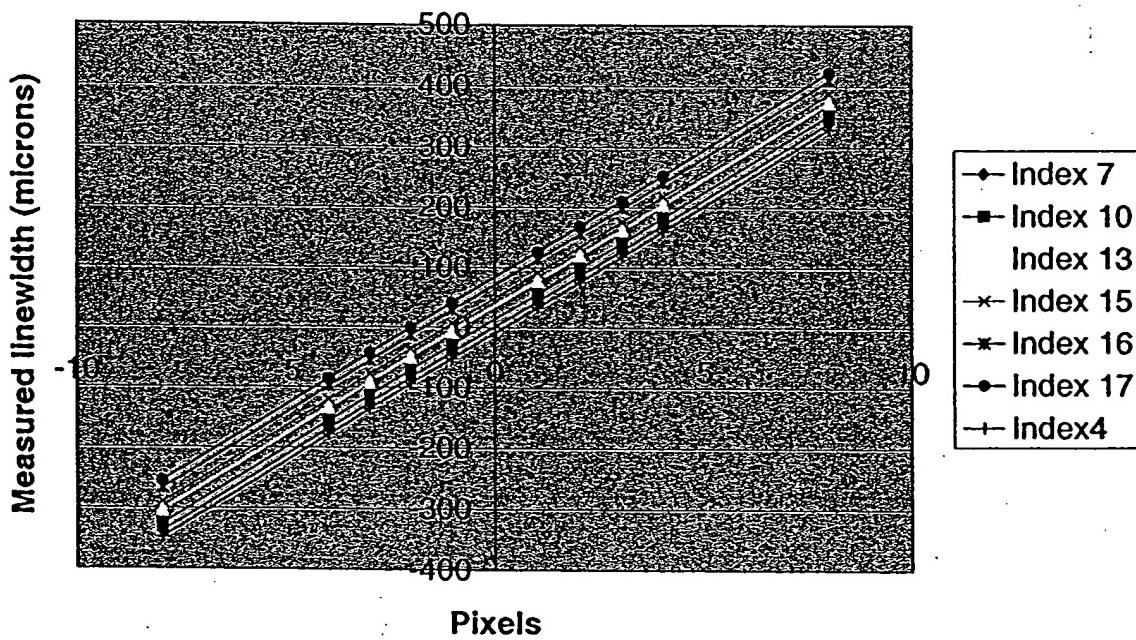


Fig. 16

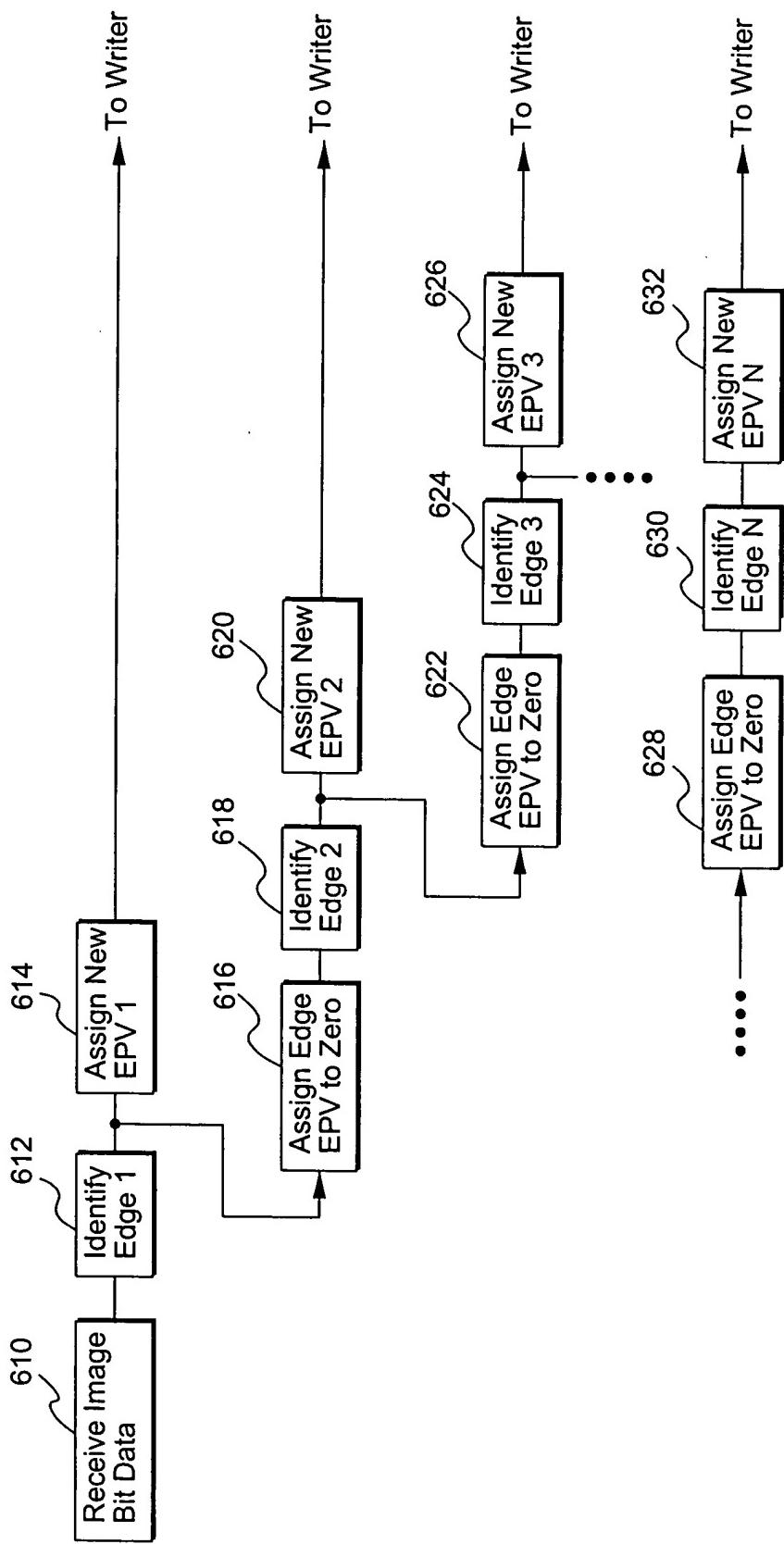


FIG. 17